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(54) D.C. cut-off extinguishing ARC circuit

(57) When the switch between D.C.power source and load side is cut off, its residual will cause great damage to the life of the switch contact because the air between contact points are ionized. This invention uses a capacitor which is parallelled with the main switch to actuate as a transient shunt so as to improve the residual phenomenon when main switch is cut off.

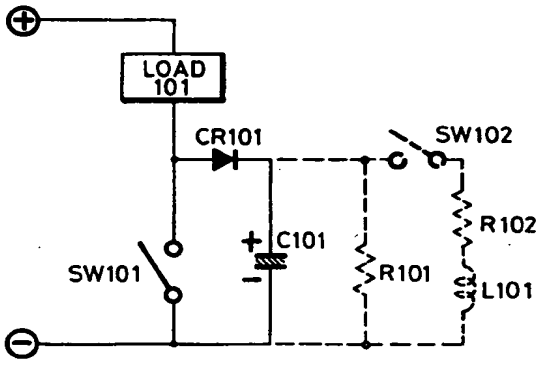

FIG. 1

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SUMMARY OF THE INVENTION:

When the switch between D.C.power source and load side is cut off, its residual will cause great damage to the life of the switch contact because the air between contact points are ionised. This invention uses a capacitor which is parallelled with the main switch to actuate as a transient shunt so as to improve the residual phenomenon when main switch is cut off.

BRIEF DESCRIPTION OF THE DRAWINGS:

FIG1 is a schematic view of the D.C.cut-off extinguishing arc circuit.

FIG2 is a schematic view of an embodiment of double switch of the D.C.cut-off extinguishing arc circuit which is further cut off in order.

DETAILED DESCRIPTION OF THE INVENTION:

It is known that when the switch between D.C.power source and load side is cut off, its residual will cause great damage to the life of the switch contact because the air between contact points are ionized. This invention uses a capacitor which is parallelled with the main switch to actuate as a transient shunt so as to improve the residual phenomenon when main switch is cut off.

The embodiments of the invention can be illustrates as follows:

FIG1 is a schematic view of the D.C.cut-off extinguishing arc circuit. The circuit consists of D.C.power source, a switch element, a capacitor, a separated diode, and an auxiliary discharge circuit element, its circuit features are as follows:

--D.C.power source, including a pure direct current or a pulse direct current;

--load 101 includes all kinds of load or motors of resisting, or electroinductive, or combined type;

--electromechanic switch elemenet SW101 is provided for series with the load and then parallel with the D.C.power source;

--a separated diode CR101 is series with capacitor C101 according to the order of D.C.power source polarity and then is parallel with the two ends of the electromechanic switch elemenet SW101 ;

--flow resistance R101 is directly series with the capacitor C101, or is series from the flow resistance R102 to the ccontrol switch SW102 and then is parallel with the two ends of capacitor C101 for capacitor to discharge at a proper time, the flow resistanc R102 includes a dependent series with the electric resisting load and a flow load;

It uses the capacitor to absorb current to improve the residual arc at the transient time of cutting off the switch and then discharge the electric charge of the capacitor storage to prepare for extinguishing the arc when the main switch is cut off for a second time;

FIG2 is a schematic view of an embodiment of double switch of the D.C.cut-off extinguishing arc circuit which is further cut off in order. The embodiment of the invention cconsists of :

--D.C.power source, including pure or pulse direct current;

--load 201 including all kinds of load or motors of resisting, or electroinductive, or combined type;

--electromechanic switch elemenet SW201 is provided for series with the load and then parallel with the D.C.power source;

--a separated diode CR201 is series with capacitor C201 according to the order of D.C.power source polarity and then is parallel with the two ends of the electromechanic switch elemenet SW101 ;

--flow resistance R201 is directly series with the capacitor C201, or is series from the flow resistance R202 to the ccontrol switch SW202 and then is parallel with the two ends of capacitor C201 for capacitor to discharge at a proper time, the flow resistanc R202 includes a dependent series with the electric resisting load L201 for a flow resistance;

--separated diode CR201 is series together with the capacitor C201 through the closed contact NC and the dependent contact COM of flow switch SW202 and then is parallel with the two ends of the SW201; flow resistance R202 (or further series with the electroinductive reistance L201) is connected with the earth end of the capacitor and with the open contact NO so as to charge the residual power energy of the capacitor when the switch is turned to open contact NO and dependent contact COM;

--the time for starting the electromechanic switch SW201 is before the switching-off of the dependent contact COM and close contact NC of the flow switch SW202 is turned into the closing of the dependent contact COM and open contact NO so as to reduce the arcing phenomenon when the electromechanic switch SW201 is cut off.

IN practical use, the D.C.cut-off extinguishing arc circuit can be structured by series or parallel multiple units, and the flow resistance and series electric resisting can be structured by an electric resisting of electric resistance.

By means of the embodiments illustrated in FIG1 and FIG2, the reader can apply the contact

points to a single unit or a multiple unit, including the series or multiple sife for breakers, magnetic switches, manual switches, or over-load cut-off breakers.

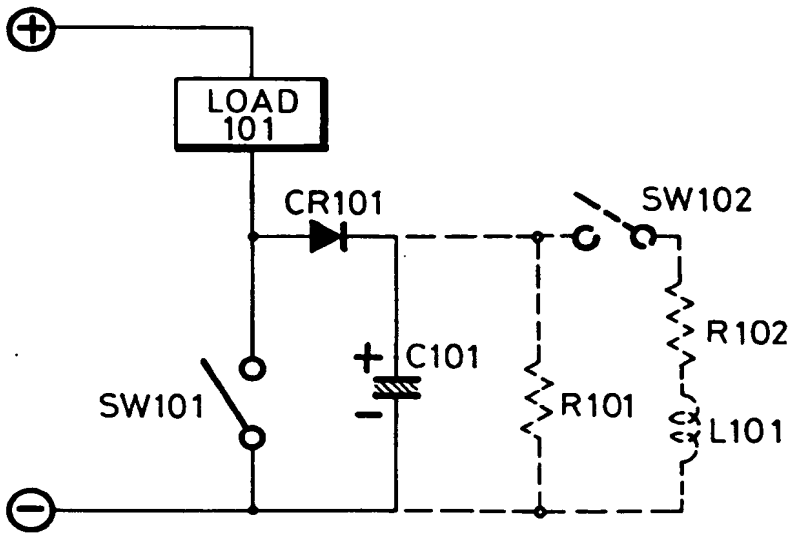
In conclusion, the present invention provides a capacitor which is parallelled with the main switch to actuate as a transient shunt so as to improve the residual phenomenon when main switch is cut off.

Claims

1. The D.C. cut-off extinguishing arc circuit, comprising a capacitor which is parallelled with the main switch to actuate as a transient shunt so as to improve the residual phenomenon when main switch is cut off; it is comprised of
   --D.C.power source, including a pure direct current or a pulse direct current;
   --load 101 including all kinds of load or motors of resisting, or electroinductive, or combined type;
   --electromechanic switch elemenet SW101 is provided for series with the load and then parallel with the D.C.power source;
   --a separated diode CR101 which is series with capacitor C101 according to the order of D.C.power source polarity and then is parallel with the two ends of the electromechanic switch elemenet SW101 ; .
   --flow resistance R101 which is directly series with the capacitor C101, or is series from the flow resistance R102 to the ccontrol switch SW102 and then is parallel with the two ends of capacitor C101 for capacitor to discharge at a proper time, the flow resistanc R102 includes a dependent series with the electric resisting load and a flow load;
   it uses the capacitor to absorb current to improve the residual arc at the transient time of cutting off the switch and then discharge the electric charge of the capacitor storage to prepare for extinguishing the arc when the main switch is cut off for a second time;

2. As claimed in Claim 1, the D.C.cut-off extinguishing arc circuit where in
   --D.C.power source, including pure or pulse direct current;
   --load 201, including all kinds of load or motors of resisting, or electroinductive, or combined type;
   --electromechanic switch elemenet SW201 is provided for series with the load and then parallel with the D.C.power source;
   --a separated diode CR201 which is series with capacitor C201 according to the order of D.C.power source polarity and then is parallel with the two ends
   of the electromechanic switch elemenet SW101 ;
   --flow resistance R201 which is directly series with capacitor C201, or is series from the flow resistance R202 to the ccontrol switch SW202 and then is parallel with the two ends of capacitor C201 for capacitor to discharge at a proper time, the flow resistanc R202 includes a dependent series with the electric resisting load L201 for a flow resistance;
   --separated diode CR201 which is series together with the capacitor C201 through the closed contact NC and the dependent contact COM of flow switch SW202 and then is parallel with the two ends of the SW201; flow resistance R202 (or further series with the electroinductive reistance L201) is connected with the earth end of the capacitor and with the open contact NO so as to charge the residual power energy of the capacitor when the switch is turned to open contact NO and dependent contact COM;
   --the time for starting the electromechanic switch SW201 is before the switching-off of the dependent contact COM and close contact NC of the flow switch SW202 is turned into the closing of the dependent contact COM and open contact NO so as to reduce the arcing phenomenon when the electromechanic switch SW201 is cut off;.
   the D.C.cut-off extinguishing arc circuit in practical use can be structured by series or parallel multiple units, and the flow resistance and series electric resisting can be structured by an electric resisting of electric resistance.

3. As claimed in Claim 1, the D.C.cut-off extinguishing arc circuit wherein the contact points can be used for a single unit or a multiple unit, including the series or multiple sife for breakers, magnetic switches, manual switches, or over-load cut-off breakers.


LOAD
101
CR101
SW102
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L101

FIG. 1

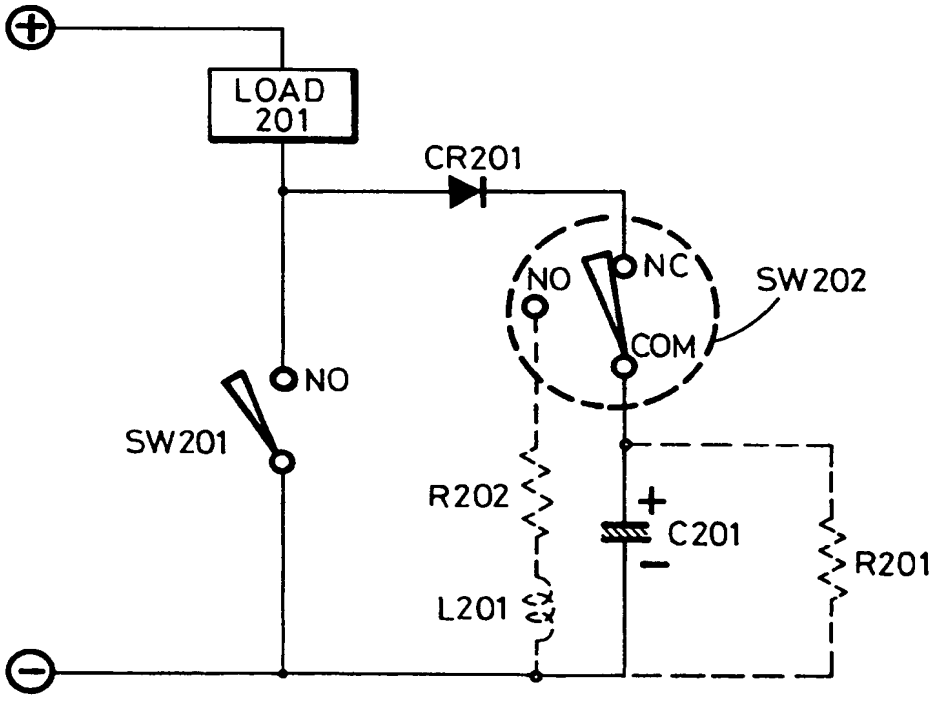
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FIG. 2

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EUROPEAN SEARCH REPORT

Application Number
EP 94 30 0825

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X Y	US-A-3 739 192 (OSWALD) * the whole document * ---	1 2,3	H01H9/42
Y	DE-A-21 37 082 (DIETER) * the whole document * ---	2,3	
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Y	FR-A-1 537 776 (GRATZMULLER) * the whole document * -----	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6) H01H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	30 June 1994	Desmet, W

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